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03/01/88

MATERIAL SAFETY DATA SHEET

Company	Issue Date	Identification Number
BRALCO METALS 8321 CANFORD ST PICO RIVERA, CALIFORNIA 90660	NOVEMBER 25, 1985 REVISED MARCH 1, 1988	CARBON STEEL i.e. A36 1018, 1010, 1040 PRESSURE VESSLE QUALITY LEADED CARBON i.e 10L42
Trade Name (Common Name or Synonym): CARBON STEEL HR & CR LEADED CARBON	Emergency Phone Number: 213-582-2272 213-723-3601	
Chemical Name	Formula	DOT Identification Number: NA

I. INGREDIENTS

NOTE PRODUCTS UNDER NORMAL CONDITIONS DO NOT REPRESENT AN INHALATION, INGESTION OR CONTACT HEALTH HAZARD.

BASE METAL, ALLOYING ELEMENTS AND METALLIC COATINGS	CAS #	% COMPOSITION BY WEIGHT (1)	OSHA PEL	ACGIH TLV (mg/m³) (2)
Base Metal				
Iron	7439-89-6	97-99	10	5 (As Iron Oxide)
Alloying Elements				
Manganese (Mn)	7439-96-5	<2	5	5 (As Dust-Ceiling)
Carbon (C)	7440-44-0	<2	N.E.	N.E.
Aluminum (Al)	7429-90-5	<1	N.E.	10 (Yellow)
Phosphorus (P)	7723-14-0	<1	.1	.1
Sulfur (S)	7704-34-9	<1	13	5 (As SO_2)
Silicon (Si)	7740-21-3	<1	15	10 (Total Dust)
Vanadium (V)	7440-62-2	<1	.5	.05 (As Respirable Dust)
Colombian (Cb)	7440-03-1	<1	N.E.	N.E.
Bismuth (Bi)	7440-69-9	<1	N.E.	N.E.
Lead Carbon i.e. 10L42				
Lead (Pb)	7439-92-1	<1	.05	.15 (Dust-Fume)

(1) % OF ALLOYING MATERIAL VARIES WITH GRADE OF MATERIAL (2) 1985 - 1986 ACGIH THRESHOLD LIMIT VALUE

II. PHYSICAL DATA

Material is (At Normal Conditions)	Appearance and Odor			
☐ Liquid ■ Solid ☐ Gas ☐ Other	GREY/BLACK, ODORLESS			
Acidity/Alkalinity pH = NA	Melting Point > 2500 F Boiling Point NA F	Specific Gravity (H_2O = 1) APPROXIMATELY 7 Solubility in water (% by weight) NA	Vapor Pressure (mm Hg at 20 C) NA	

III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection	Hands, Arms and Body
NIOSH/MSHA APPROVED DUST & FUME RESPIRATOR SHOULD BE USED TO AVOID EXCESSIVE INHALATION OF PARTICULATES WHEN EXPOSURE EXCEEDS TLV'S	PROTECTIVE GLOVES ARE RECOMMENDED DURING HANDLING OF FINES EXPOSURE
Eyes and Face SAFETY GLASSES OR GOGGLES SHOULD BE UTILIZED AS REQUIRED BY EXPOSURE	**Other Clothing and Equipment** OTHER PROTECTIVE EQUIPMENT SHOULD BE UTILIZED AS REQUIRED BY THE WELDING STANDARD

IV. EMERGENCY MEDICAL PROCEDURES

IF EXPOSED TO EXCESSIVE LEVELS OF METAL FUMES, REMOVE TO FRESH AIR.

SEEK MEDICAL AID IMMEDIATELY.

EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES.

V. HEALTH/SAFETY INFORMATION

STEEL PRODUCTS IN THE NATURAL STATE DO NOT PRESENT AN INHALATION, INGESTION OR CONTACT HAZARD. HOWEVER, OPERATIONS SUCH AS BURNING, WELDING, SAWING, BRAZING AND GRINDING MAY RELEASE FUMES AND/OR DUSTS WHICH MAY PRESENT HEALTH HAZARDS IF TLV'S ARE EXCEEDED

MAJOR EXPOSURE HAZARD
☒ INHALATION ☐ SKIN CONTACT ☐ SKIN ABSORPTION ☐ INGESTION

Short term exposure to fumes/dust may produce irritation of eyes and respiratory system. Inhalation of high concentrations of freshly formed oxide fumes of iron, manganese, and lead may cause metal fume fever, characterized by a metallic taste in the mouth, dryness and irritation of the throat and influenza-like symptoms.

Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Inhalation or ingestion of lead particles may result in lead-induced systemic toxicity. Symptoms of lead poisoning include abdominal cramps, anemia, muscle weakness and headache. Prolonged exposure can cause behavioral changes, kidney damage, CNS damage and reproductive effects.

SUSPECTED CANCER AGENT? NO. THIS PRODUCTS INGREDIENTS ARE NOT FOUND IN THE LISTS BELOW
✓YES: FEDERAL OSHA ✓NTP IARC

Fire and Explosion	Flash Point NA F	Auto Ignition Temperature NA F	Flammable Limits in Air Lower % Upper NA %	Extinguishing Media NA
	Fire and Explosion Hazards: STEEL PRODUCTS IN THE SOLID STATE PRESENT NO FIRE OR EXPLOSION HAZARD			Extinguishing Media not to be used: NA
Reactivity	Stability ■Stable ☐Unstable	Incompatibility (Materials to Avoid) REACTS WITH STRONG ACIDS TO PRODUCE HYDROGEN GAS		
	Conditions to Avoid NA			
	Hazardous Decomposition Products: METALLIC DUST OR FUMES MAY BE PRODUCED DURING WELDING, BURNING, GRINDING & POSSIBLY MACHINING. REFER TO ANSI Z49.1			

VI. ENVIRONMENTAL

Spill or Leak Procedures
NA

Waste Disposal Method
ACCORDING TO LOCAL, STATE AND FEDERAL REGULATIONS

VII. ADDITIONAL INFORMATION

VENTILATION: LOCAL EXHAUST VENTILATION SHOULD BE UTILIZED WHEN WELDING, BURNING, SAWING, BRAZING, GRINDING OR MACHINING WHEN EXPOSURE EXCEEDS TLV'S

IN WELDING, PRECAUTIONS SHOULD BE TAKEN FOR AIRBORNE CONTAMINATES WHICH MAY ORIGINATE FROM COMPONENTS OF WELDING ROD

ARC OR SPARK GENERATED WHEN WELDING OR BURNING COULD BE A SOURCE OF IGNITION FOR COMBUSTABLE AND FLAMMABLE MATERIALS

MATERIAL SAFETY DATA SHEET

Company	Issue Date	Identification Number
BRALCO METALS 8321 CANFORD ST PICO RIVERA, CALIFORNIA 90660	NOVEMBER 25, 1985 REVISED MARCH 1, 1988	ALLOY STEEL HR & CR ALLOY LEADED STEEL
Trade Name (Common Name or Synonym) ALLOY LEADED i.e. 86L20 ALLOY STEEL i.e. 4130, 4140, 4340, 8620	Emergency Phone Number 213-582-2272 213-723-3801	
Chemical Name	Formula	DOT Identification Number NA

I. INGREDIENTS

NOTE PRODUCTS UNDER NORMAL CONDITIONS DO NOT REPRESENT AN INHALATION, INGESTION OR CONTACT HEALTH HAZARD.

BASE METAL, ALLOYING ELEMENTS AND METALLIC COATINGS	CAS #	% COMPOSITION BY WEIGHT (1)	OSHA PEL	ACGIH TLV (mg/m³) (2)
Base Metal				
Iron (Fe)	7439-89-6	86-99	10	5 (As Iron Oxide)
Alloying Elements				
Nickel (Ni)	7440-02-0	<5	1	1
Chromium (Cr)	7440-47-3	<5	.5	.5
Silicon (Si)	7740-21-3	<5	15	10 (Total Dust)
Manganese (Mn)	7439-96-5	<2	5	5 (As Dust-Ceiling)
Carbon (C)	7440-44-0	<2	N.E.	N.E.
Molybdenum (Mo)	7439-98-7	<2	15	10 (Insoluble Compound)
Vanadium (V)	7440-62-2	<2	.5	.05 (Respirable Dust)
Aluminum (Al)	7429-90-5	<2	N.E.	10
Sulfur (S)	7704-34-9	<2	13	5 (As SO_2)
Phosphorus (P)	7723-14-0	<1	.1	.1 (Yellow)
Bismuth (Bi)	7440-69-9	<1	N.E.	N.E.
Copper (Cu)	7440-50-8	<1	1	1 (Dust & Mist)
Leaded Alloy				
Lead (Pb)	7439-92-1	<1	.05	.15 (Dust & Fume)

(1) % OF ALLOYING MATERIAL VARIES WITH GRADE OF MATERIAL (2) 1985 - 1986 ACGIH THRESHOLD LIMIT VALUE

II. PHYSICAL DATA

Material is (At Normal Conditions)	Appearance and Odor			
☐ Liquid ■ Solid ☐ Gas ☐ Other	GREY/BLACK ODORLESS			
Acidity/Alkalinity pH - NA	Melting Point > 2500 F Boiling Point NA F	Specific Gravity (H_2O = 1) APPROXIMATELY 7 Solubility in water (% by weight) NA	Vapor Pressure (mm Hg at 20 C) NA	

III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection	Hands, Arms and Body
NIOSH/MSHA APPROVED DUST & FUME RESPIRATOR SHOULD BE USED TO AVOID EXCESSIVE INHALATION OF PARTICULATES WHEN EXPOSURE EXCEEDS TLV'S	PROTECTIVE GLOVES ARE RECOMMENDED DURING HANDLING OF FINES EXPOSURE
Eyes and Face SAFETY GLASSES OR GOGGLES SHOULD BE UTILIZED AS REQUIRED BY EXPOSURE	Other Clothing and Equipment OTHER PROTECTIVE EQUIPMENT SHOULD BE UTILIZED AS REQUIRED BY THE WELDING STANDARD

IV. EMERGENCY MEDICAL PROCEDURES

IF EXPOSED TO EXCESSIVE LEVELS OF METAL FUMES, REMOVE TO FRESH AIR.

SEEK MEDICAL AID IMMEDIATELY.

EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES.

V. HEALTH/SAFETY INFORMATION

STEEL PRODUCTS IN THE NATURAL STATE DO NOT PRESENT AN INHALATION, INGESTION OR CONTACT HAZARD. HOWEVER, OPERATIONS SUCH AS BURNING, WELDING, SAWING, BRAZING AND GRINDING MAY RELEASE FUMES AND/OR DUSTS WHICH MAY PRESENT HEALTH HAZARDS IF TLV'S ARE EXCEEDED

MAJOR EXPOSURE HAZARD
■ INHALATION ■ SKIN CONTACT □ SKIN ABSORPTION ■ INGESTION

Short term exposure to fumes/dust may produce irritation of eyes and respiratory system. Inhalation of high concentrations of freshly formed oxide fumes of iron, manganese, copper and lead may cause metal fume fever, characterized by a metallic taste in the mouth, dryness and irritation of the throat and influenza-like symptoms.

Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of feric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Inhalation or ingestion of lead particles may result in lead induced systemic toxicity. Symptoms of lead poisoning include abdominal cramps, anemia, muscle weakness and headache. Prolonged exposure can cause behavioral changes, kidney damage, CNS damage and reproductive effects.

Chromium and nickel and their compounds are listed in the 3rd Annual Report on carcinogens, as prepared by the National Toxicology Program (NTP). Exposure to high concentrations of dust and fumes can cause sensitization dermatitus, inflammation and/or ulceration of upper respiratory tract and possible cancer of nasal passages and lungs.

Recent epidemiological studies of workers melting and working alloys containing nickel/chromium have found no increased risk of cancer.

SUSPECTED CANCER AGENT? NO. THIS PRODUCTS INGREDIENTS ARE NOT FOUND IN THE LISTS BELOW
✓YES FEDERAL OSHA ✓NTP IARC

Fire and Explosion	Flash Point NA F	Auto Ignition Temperature NA F	Flammable Limits in Air Lower NA % Upper %	Extinguishing Media NA
	Fire and Explosion Hazards: STEEL PRODUCTS IN THE SOLID STATE PRESENT NO FIRE OR EXPLOSION HAZARD			Extinguishing Media not to be used: NA
Reactivity	Stability ■ Stable □ Unstable	Incompatibility (Materials to Avoid) REACTS WITH STRONG ACIDS TO PRODUCE HYDROGEN GAS		
	Conditions to Avoid NA			
	Hazardous Decomposition Products: METALLIC DUST OR FUMES MAY BE PRODUCED DURING WELDING, BURNING, GRINDING & POSSIBLY MACHINING. REFER TO ANSI Z49.1			

VI. ENVIRONMENTAL

Spill or Leak Procedures: NA

Waste Disposal Method: ACCORDING TO LOCAL, STATE AND FEDERAL REGULATIONS

VII. ADDITIONAL INFORMATION

VENTILATION: LOCAL EXHAUST VENTILATION SHOULD BE UTILIZED WHEN WELDING, BURNING SAWING, BRAZING, GRINDING OR MACHINING WHEN EXPOSURE EXCEEDS TLV'S

IN WELDING, PRECAUTIONS SHOULD BE TAKEN FOR AIRBORNE CONTAMINATES WHICH MAY ORIGINATE FROM COMPONENTS OF WELDING ROD

ARC OR SPARK GENERATED WHEN WELDING OR BURNING COULD BE A SOURCE OF IGNITION FOR COMBUSTABLE AND FLAMMABLE MATERIALS

MATERIAL SAFETY DATA SHEET

Company	Issue Date	Identification Number
BRALCO METALS 8321 CANFORD ST PICO RIVERA, CALIFORNIA 90660	NOVEMBER 25, 1985 REVISED MARCH 1, 1988	GALVANIZED SHEET CARBON STEEL - HSLA STEEL GALVALUME - ELECTROLYTIC
Trade Name (Common Name or Synonym) GALVANIZED	Emergency Phone Number 213-582-2272 213-723-3601	
Chemical Name	Formula	DOT Identification Number NA

I. INGREDIENTS

NOTE PRODUCTS UNDER NORMAL CONDITIONS DO NOT REPRESENT AN INHALATION, INGESTION OR CONTACT HEALTH HAZARD.

BASE METAL, ALLOYING ELEMENTS AND METALLIC COATINGS	CAS #	% COMPOSITION BY WEIGHT (1)	OSHA PEL	ACGIH TLV (mg/m³) (2)
BASE METAL				
Iron (Fe)	7439-89-6	Balance	10	5 (as iron oxide)
ALLOYING ELEMENTS				
Carbon (C)	7440-44-0	.25 Max.	N.E.	N.E.
Manganese (Mn)	7439-96-5	2	5	5 (as dust-ceiling)
Phosphorus (P)	7223-14-0	.15 Max	.1	1 (yellow)
Sulfur (S)	7704-34-9	.05 Max.	13	5 (as So)
Columbium Niobium (Nb)	7440-03-1	.10 Max.	.02	.02
Vanadium (V)	7440-62-2	.20 Max.	.5	.05 (as respirable dust)
Titanium (Ti)	7440-32-6	.30 Max.	15	10 (total dust)
Rare Earth (Ce)		.10 Max	N.E.	N.E.
Aluminum (Al)	7429-90-5	.10 Max.	N.E.	10 (yellow)
Chromium (Cr)	7440-47-3	.01-2.0	1 as chrome	.5 as chrome salts
Nickel (Ni)	7440-02-0	.01-1.0	1	1
Copper (Cu)	7440-50-8	.01-1.0	1	1 (as dust & mist)
METALLIC COATING				
Zinc (Zn)	7440-66-1	10 Max	5	5.0 (10)
Aluminum (Al)	7429-90-5	6 Max	N.E.	10 (yellow)
Antimony (Sb)	7440-36-0	.02 Max	.5	.5
Lead (P6)	7439-92-1	.02 Max	.05	.15 (Dust-fume)
Iron (Fe)	7439-89-6	2	10	5 (as Iron Oxide)
Silicon (Si)	7740-21-3	.2 Max	15	10 (Total Dust)

(1) % OF ALLOYING MATERIAL VARIES WITH GRADE OF MATERIAL (2) 1985 - 1988 ACGIH THRESHOLD LIMIT VALUE

II. PHYSICAL DATA

Material is (At Normal Conditions)	Appearance and Odor		
☐ Liquid ■ Solid ☐ Gas ☐ Other	METALLIC GREY, ODORLESS		
Acidity/Alkalinity pH - NA	Melting Point 2750 F Metallic Coating 800 - 1040 F	Specific Gravity (H_2O = 1) 7.6 - 7.8 Solubility in water (% by weight) NA	Vapor Pressure (mm Hg at 20 C) NA

III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection	Hands, Arms and Body
NIOSH/MSHA APPROVED DUST & FUME RESPIRATOR SHOULD BE USED TO AVOID EXCESSIVE INHALATION OF PARTICULATES WHEN EXPOSURE EXCEEDS TLV'S	PROTECTIVE GLOVES ARE RECOMMENDED DURING HANDLING OF FINES EXPOSURE
Eyes and Face SAFETY GLASSES OR GOGGLES SHOULD BE UTILIZED AS REQUIRED BY EXPOSURE	Other Clothing and Equipment OTHER PROTECTIVE EQUIPMENT SHOULD BE UTILIZED AS REQUIRED BY THE WELDING STANDARD

IV. EMERGENCY MEDICAL PROCEDURES

IF EXPOSED TO EXCESSIVE LEVELS OF METAL FUMES, REMOVE TO FRESH AIR.

SEEK MEDICAL AID IMMEDIATELY.

EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES.

V. HEALTH/SAFETY INFORMATION

STEEL PRODUCTS IN THE NATURAL STATE DO NOT PRESENT AN INHALATION, INGESTION OR CONTACT HAZARD. HOWEVER, OPERATIONS SUCH AS BURNING, WELDING, SAWING, BRAZING AND GRINDING MAY RELEASE FUMES AND/OR DUSTS WHICH MAY PRESENT HEALTH HAZARDS IF TLV'S ARE EXCEEDED

MAJOR EXPOSURE HAZARD

☒ INHALATION ☐ SKIN CONTACT ☐ SKIN ABSORPTION ☐ INGESTION

Short term exposure to fumes/dust may produce irritation of eyes and respiratory system. Inhalation of high concentrations of freshly formed oxide fumes of iron, manganese, and lead may cause metal fume fever, characterized by a metallic taste in the mouth, dryness and irritation of the throat and influenza symptoms.

Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Inhalation or ingestion of lead particles may result in lead-induced systemic toxicity. Symptoms of lead poisoning include abdominal cramps, anemia, muscle weakness and headache. Prolonged exposure can cause behavioral changes, kidney damage, CNS damage and reproductive effects.

Chromium and nickel and their compounds are listed in the 3rd Annual Report on carcinogens, as prepared by the National Toxicology Program (NTP). Exposure to high concentrations of dust and fumes can cause sensitization dermatitis, inflammation and/or ulceration of upper respiratory tract and possibly cancer of nasal passages and lungs.

Recent epidemiological studies of workers melting and working alloys containing nickel/chromium have found no increased risk of cancer.

Subjecting zinc or alloys containing zinc to high temperatures (such as occurs during welding) will cause the formation of zinc oxide. Exposure to zinc oxide fumes or dusts can result in a flu-like illness called metal fume fever. Early symptoms may include a sweet or metallic taste in the mouth, dryness and irritation of the throat, and caughing. These symptoms may progress to shortness of breath, headache, fever, chills, muscle aches, nausea, vomiting, weakness, fatigue and profuse sweating. The attack may last 6-48 hours and is more likely to occur after a period away from the job.

SUSPECTED CANCER AGENT? NO. THIS PRODUCTS INGREDIENTS ARE NOT FOUND IN THE LISTS BELOW

✓YES: FEDERAL OSHA ✓NTP IARC

Fire and Explosion	Flash Point NA F	Auto Ignition Temperature NA F	Flammable Limits in Air Lower NA % Upper %	Extinguishing Media NA

	Fire and Explosion Hazards STEEL PRODUCTS IN THE SOLID STATE PRESENT NO FIRE OR EXPLOSION HAZARD	Extinguishing Media not to be used NA

Reactivity	Stability ■Stable ☐Unstable	Incompatibility (Materials to Avoid) REACTS WITH STRONG ACIDS TO PRODUCE HYDROGEN GAS AT TEMPERATURES ABOVE MELTING POINT OF THE COATING, MAY PRODUCE ALUMINUM OR ZINK FUMES
	Conditions to Avoid NA	
	Hazardous Decomposition Products METALLIC DUST OR FUMES MAY BE PRODUCED DURING WELDING, BURNING, GRINDING & POSSIBLY MACHINING. REFER TO ANSI Z49.1	

VI. ENVIRONMENTAL

Spill or Leak Procedures

NA

Waste Disposal Method

ACCORDING TO LOCAL, STATE AND FEDERAL REGULATIONS

VII. ADDITIONAL INFORMATION

VENTILATION: LOCAL EXHAUST VENTILATION SHOULD BE UTILIZED WHEN WELDING, BURNING, SAWING, BRAZING, GRINDING OR MACHINING WHEN EXPOSURE EXCEEDS TLV'S

IN WELDING, PRECAUTIONS SHOULD BE TAKEN FOR AIRBORNE CONTAMINATES WHICH MAY ORIGINATE FROM COMPONENTS OF WELDING ROD

ARC OR SPARK GENERATED WHEN WELDING OR BURNING COULD BE A SOURCE OF IGNITION FOR COMBUSTABLE AND FLAMMABLE MATERIALS

MATERIAL SAFETY DATA SHEET

Company	Issue Date	Identification Number
BRALCO METALS 6321 CANFORD STREET PICO RIVERA, CALIFORNIA 90660	NOVEMBER 25, 1985 REVISED MARCH 1, 1988	3XXX SERIES 4XXX SERIES
Trade Name (Common Name or Synonym) STAINLESS STEEL	Emergency Phone Number 213-582-2272 213-723-3601	
Chemical Name	Formula	DOT Identification Number NA

I. INGREDIENTS

NOTE PRODUCTS UNDER NORMAL CONDITIONS DO NOT REPRESENT AN INHALATION, INGESTION OR CONTACT HEALTH HAZARD.

BASE METAL, ALLOYING ELEMENTS AND METALLIC COATINGS	CAS #	% COMPOSITION BY WEIGHT (1)	OSHA PEL	ACGIH TLV (mg/m³) (2)
Base Metal				
Iron (Fe)	7439-89-6	60-88	10	5 (As Iron Oxide)
Alloying Elements				
Chromium (Cr)	7440-47-3	10-30	.5	.5
Nickel (Ni)	7440-02-0	0-27	1	1
Manganese (Mn)	7439-96-5	<6	5	5 (As Dust-Ceiling)
Molybdenum (Mo)	7439-98-7	<6	15	10 (Insoluble Compound)
Copper (Cu)	7440-50-8	<6	1	1 (Dust & Mist)
Titanium (Ti)	7440-32-6	<6	15	10 (Total Dust)
Carbon (C)	7440-44-0	<2	N.E.	N.E.
Phosphorus (P)	7723-14-0	<2	.1	.1 (Yellow)
Sulfur (S)	7704-34-9	<2	13	5 (As SO_2)
Silicon (Si)	7740-21-3	<2	15	10 (Total Dust)
Cobalt (Co)	7440-48-4	<2	.1	.1 (Dust & Fume)
Niobium (Nb)	7440-03-1	<2	5	5 (Tantalum)
Tin (Sn)	7440-31-5	<2	2	2

(1) % OF ALLOYING MATERIAL VARIES WITH GRADE OF MATERIAL (2) 1985 - 1986 ACGIH THRESHOLD LIMIT VALUE

II. PHYSICAL DATA

Material is (At Normal Conditions)	Appearance and Odor			
☐ Liquid ■ Solid ☐ Gas ☐ Other	GREY/BLACK, ODORLESS			
Acidity/Alkalinity pH - NA	Melting Point 2500 F Boiling Point NA F	Specific Gravity (H_2O = 1) APPROXIMATELY 7 Solubility in water (% by weight) NIL		Vapor Pressure (mm Hg at 20 C) NA

III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection	Hands, Arms and Body
NIOSH/MSHA APPROVED DUST & FUME RESPIRATOR SHOULD BE USED TO AVOID EXCESSIVE INHALATION OF PARTICULATES WHEN EXPOSURE EXCEEDS TLV'S	PROTECTIVE GLOVES ARE RECOMMENDED DURING HANDLING OF FINES EXPOSURE
Eyes and Face	**Other Clothing and Equipment**
SAFETY GLASSES OR GOGGLES SHOULD BE UTILIZED AS REQUIRED BY EXPOSURE	OTHER PROTECTIVE EQUIPMENT SHOULD BE UTILIZED AS REQUIRED BY THE WELDING STANDARD

IV. EMERGENCY MEDICAL PROCEDURES

IF EXPOSED TO EXCESSIVE LEVELS OF METAL FUMES, REMOVE TO FRESH AIR.

SEEK MEDICAL AID IMMEDIATELY.

EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES.

V. HEALTH/SAFETY INFORMATION

STEEL PRODUCTS IN THE NATURAL STATE DO NOT PRESENT AN INHALATION, INGESTION OR CONTACT HAZARD. HOWEVER, OPERATIONS SUCH AS BURNING, WELDING, SAWING, BRAZING AND GRINDING MAY RELEASE FUMES AND/OR DUSTS WHICH MAY PRESENT HEALTH HAZARDS IF TLV'S ARE EXCEEDED

MAJOR EXPOSURE HAZARD

☒ INHALATION ☐ SKIN CONTACT ☐ SKIN ABSORPTION ☐ INGESTION

Short term exposure to fumes/dust may produce irritation of eyes and respiratory system. Inhalation of high concentrations of freshly formed oxide fumes or iron, manganese and copper may cause metal fume fever characterized by a metallic taste in the mouth, dryness and irritation of the throat and influenza-like symptoms.

Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Chromium and nickel and their compounds are listed in the 3rd Annual Report on carcinogens, as prepared by the National Toxicology Program (NTP). Exposure to high concentrations of dust and fumes can cause sensitization dermatitis, inflammation and/or ulceration of upper respiratory tract and possibly cancer of nasal passages and lungs.

Recent epidemiological studies of workers melting and working alloys containing nickel/chromium have found no increased risk of cancer.

SUSPECTED CANCER AGENT? NO. THIS PRODUCTS INGREDIENTS ARE NOT FOUND IN THE LISTS BELOW
✓YES FEDERAL OSHA ✓NTP IARC

Fire and Explosion	Flash Point NA F	Auto Ignition Temperature NA F	Flammable Limits in Air Lower NA % Upper %	Extinguishing Media NA
	Fire and Explosion Hazards: STEEL PRODUCTS IN THE SOLID STATE PRESENT NO FIRE OR EXPLOSION HAZARD			Extinguishing Media not to be used: NA
Reactivity	Stability ■Stable ☐Unstable	Incompatibility (Materials to Avoid) REACTS WITH STRONG ACIDS TO PRODUCE HYDROGEN GAS		
	Conditions to Avoid NA			
	Hazardous Decomposition Products: METALLIC DUST OR FUMES MAY BE PRODUCED DURING WELDING, BURNING, GRINDING & POSSIBLY MACHINING REFER TO ANSI Z49.1			

VI. ENVIRONMENTAL

Spill or Leak Procedures: NA

Waste Disposal Method: ACCORDING TO LOCAL, STATE AND FEDERAL REGULATIONS

VII. ADDITIONAL INFORMATION

VENTILATION: LOCAL EXHAUST VENTILATION SHOULD BE UTILIZED WHEN WELDING, BURNING SAWING, BRAZING, GRINDING OR MACHINING WHEN EXPOSURE EXCEEDS TLV'S

IN WELDING, PRECAUTIONS SHOULD BE TAKEN FOR AIRBORNE CONTAMINATES WHICH MAY ORIGINATE FROM COMPONENTS OF WELDING ROD

ARC OR SPARK GENERATED WHEN WELDING OR BURNING COULD BE A SOURCE OF IGNITION FOR COMBUSTABLE AND FLAMMABLE MATERIALS

MATERIAL SAFETY DATA SHEET

Company	Issue Date	Identification Number
BRALCO METALS 8321 CANFORD ST PICO RIVERA, CALIFORNIA 90660	NOVEMBER 25, 1985 REVISED MARCH 1, 1988	1XXX THRU 7XXX SERIES LEADED 2011 & 6262
Trade Name (Common Name or Synonym) ALUMINUM ALLOYS ALUMINUM ALLOYS CONTAINING LEAD	**Emergency Phone Number** 213-582-2272 213-723-3601	
Chemical Name	**Formula**	**DOT Identification Number** NA

I. INGREDIENTS

NOTE PRODUCTS UNDER NORMAL CONDITIONS DO NOT REPRESENT AN INHALATION, INGESTION OR CONTACT HEALTH HAZARD.

BASE METAL, ALLOYING ELEMENTS AND METALLIC COATINGS	CAS #	% COMPOSITION BY WEIGHT (1)	OSHA PEL	ACGIH TLV (mg/m³) (2)
Base Metal				
Aluminum (Al)	7429-90-5	80-99.7	N.E.	10 (Metal & Oxide)
Alloying Elements				
Copper (Cu)	7440-50-8	<10	1	1 (Dust & Mist)
Magnesium (Mg)	1309-48-4	<10	15	10
Zinc (Zn)	7440-66-6	<10	N.E.	5 (As Fume)
Cobalt (Co)	7440-48-4	<2	.1	.1 (Dust & Fume)
Iron (Fe)	7439-89-6	<2	10	5 (As Iron Oxide)
Manganese (Mn)	7439-96-5	<2	5	5 (As Dust-Ceiling)
Silicon (Si)	7440-21-3	<2	15	10 (Total Dust)
Tin (Sn)	7440-31-5	<2	2	2
Chromium (Cr)	7440-47-3	<.5	.5	.5
Nickel (Ni)	7440-02-0	<.5	1	1
Leaded Alloys 2011 & 6262				
Lead (Pb)	7439-92-1	<1	.05	.15 (Dust & Fume)

(1) % OF ALLOYING MATERIAL VARIES WITH GRADE OF MATERIAL (2) 1985 - 1986 ACGIH THRESHOLD LIMIT VALUE

II. PHYSICAL DATA

Material is (At Normal Conditions)	Appearance and Odor		
☐ Liquid ■ Solid ☐ Gas ☐ Other	SILVER METALLIC, ODORLESS		
Acidity/Alkalinity pH - NA	**Melting Point** 440 - 1220 F **Boiling Point** NA F	**Specific Gravity (H_2O = 1)** 2.5 - 2.9 **Solubility in water (% by weight)** NA	**Vapor Pressure (mm Hg at 20 C)** NA

III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection NIOSH/MSHA APPROVED DUST & FUME RESPIRATOR SHOULD BE USED TO AVOID EXCESSIVE INHALATION OF PARTICULATES WHEN EXPOSURE EXCEEDS TLV'S	**Hands, Arms and Body** PROTECTIVE GLOVES ARE RECOMMENDED DURING HANDLING OF FINES EXPOSURE
Eyes and Face SAFETY GLASSES OR GOGGLES SHOULD BE UTILIZED AS REQUIRED BY EXPOSURE	**Other Clothing and Equipment** OTHER PROTECTIVE EQUIPMENT SHOULD BE UTILIZED AS REQUIRED BY THE WELDING STANDARD

IV. EMERGENCY MEDICAL PROCEDURES

IF EXPOSED TO EXCESSIVE LEVELS OF METAL FUMES, REMOVE TO FRESH AIR,

SEEK MEDICAL AID IMMEDIATELY

EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES.

V. HEALTH/SAFETY INFORMATION

STEEL PRODUCTS IN THE NATURAL STATE DO NOT PRESENT AN INHALATION, INGESTION OR CONTACT HAZARD. HOWEVER, OPERATIONS SUCH AS BURNING, WELDING, SAWING, BRAZING AND GRINDING MAY RELEASE FUMES AND/OR DUSTS WHICH MAY PRESENT HEALTH HAZARDS IF TLV'S ARE EXCEEDED

MAJOR EXPOSURE HAZARD
☒ INHALATION ☐ SKIN CONTACT ☐ SKIN ABSORPTION ☐ INGESTION

Aluminum dust should be treated as a nuisance dust and high exposure may produce irritation of eyes and respiratory system. The potential for overexposure to copper fume may exist when welding, flame cutting, etc. on alloys containing high amounts of copper >2.5%. These alloys include 2XXX, 7XXX and 4145 wrought alloys. Overexposure to copper fume can result in respiratory irritation, nausea and metal fume fever.

Nickel and chromium are contained in certain alloys at levels of 0.1% or more. Chromium and nickel and their compounds are listed in the 3rd Annual Report on Carcinogens, as prepared by the National Toxicology Program (NTP). Their presence in Aluminum alloys, however, should not present a carcinogenic or health concern due to either their low concentrations or the chemical form in which they are present.

Inhalation or ingestion of lead particles may result in lead-induced systemic toxicity. Symptoms of lead poisoning include abdominal cramps, anemia, muscle weakness and headache. Prolonged exposure can cause behavioral changes, kidney damage, CNS damage and reproductive effects.

Plasma arc cutting or welding aluminum can generate ozone. Overexposures to ozone can result in mucous membrane irritation, as well as pulmonary changes including irritation, congestion and edema.

SUSPECTED CANCER AGENT? NO. THIS PRODUCTS INGREDIENTS ARE NOT FOUND IN THE LISTS BELOW
✓YES. FEDERAL OSHA ✓NTP IARC

Fire and Explosion	Flash Point NA F	Auto Ignition Temperature NA F	Flammable Limits in Air Lower NA % Upper %	Extinguishing Media DRY POWDER (CLASS D) OR SAND

	Fire and Explosion Hazards DAMP ALUMINUM DUST MAY SPONTANEOUSLY HEAT WITH LIBERATION OF HYDROGEN TO FORM EXPLOSIVE MIXTURES MOLTEN MAY EXPLODE ON CONTACT WITH WATER	Extinguishing Media not to be used DO NOT USE WATER OR HALOGEN ON DUST FIRES.

Reactivity	Stability ■Stable ☐Unstable	Incompatibility (Materials to Avoid) ANHYDROUS BROMINE. ALSO SEE NFPA # 491M
	Conditions to Avoid	SEE FIRE AND EXPLOSION SECTION. SEE ADDITIONAL INFORMATION.
	Hazardous Decomposition Products	SEE FIRE AND EXPLOSION SECTION. SEE ADDITIONAL INFORMATION

VI. ENVIRONMENTAL

Spill or Leak Procedures
NA

Waste Disposal Method
ACCORDING TO LOCAL, STATE AND FEDERAL REGULATIONS

VII. ADDITIONAL INFORMATION

VENTILATION: LOCAL EXHAUST VENTILATION SHOULD BE UTILIZED WHEN WELDING, BURNING, SAWING, BRAZING, GRINDING OR MACHINING WHEN EXPOSURE EXCEEDS TLV'S.

1. HALOGEN ACIDS AND SODIUM HYDROXIDE IN CONTACT WITH ALUMINUM MAY GENERATE MIXTURES OF HYDROGEN.
2. FINELY DIVIDED ALUMINUM WILL FORM EXPLOSIVE MIXTURES IN AIR. IT WILL ALSO FORM EXPLOSIVE MIXTURES IN AIR IN THE PRESENCE OF BROMATES, IODATES OR AMMONIUM NITRATE.
3. WHEN REMELTING ALUMINUM SCRAP, ENTRAPPED MOISTURE OR THE PRESENCE OF STRONG OXIDIZERS SUCH AS AMMONIUM NITRATE COULD CAUSE AN EXPLOSION. THIS APPLIES TO THE COLLECTION OF MOISTURE IN SOW CAVITIES AS WELL. MOISTURE MUST BE DRIVEN OFF PRIOR TO REMELTING.
4. DO NOT TOUCH CAST ALUMINUM METAL OR HEATED ALUMINUM PRODUCT WITHOUT KNOWING METAL TEMPERATURE. ALUMINUM EXPERIENCES NO COLOR CHANGE DURING HEATING. IF METAL IS HOT AND TOUCHED, BURNS CAN RESULT.
5. HARD ALLOY INGOTS IN THE 2000 AND 7000 SERIES MUST BE STRESS-RELIEVED TO PREVENT EXPLOSION WHEN SAWED.
6. THE WELDING OF ALUMINUM ALLOYS MAY GENERATE CARBON MONOXIDE, CARBON DIOXIDE, OZONE, NITROGEN OXIDES, INFRA-RED RADIATION AND ULTRA-VIOLET RADIATION.
7. ALUMINUM POWDER MUST BE PACKAGED AND SHIPPED AS A FLAMMABLE SOLID. UN1396.

MATERIAL SAFETY DATA SHEET

Company	Issue Date	Identification Number
BRALCO METALS 8321 CANFORD ST PICO RIVERA, CALIFORNIA 90660	NOVEMBER 25, 1985 REVISED MARCH 1, 1988	HALF HARD, SOFT, SHIM HR NAVAL, MUNTZ FREE CUTTING LEADED
Trade Name (Common Name or Synonym) BRASS	Emergency Phone Number 213-582-2272 213-723-3601	
Chemical Name	Formula	DOT Identification Number NA

I. INGREDIENTS

NOTE PRODUCTS UNDER NORMAL CONDITIONS DO NOT REPRESENT AN INHALATION, INGESTION OR CONTACT HEALTH HAZARD.

BASE METAL, ALLOYING ELEMENTS AND METALLIC COATINGS	CAS #	% COMPOSITION BY WEIGHT (1)	OSHA PEL	ACGIH TLV (mg/m³) (2)
Base Metal				
Copper (Cu)	7440-50-8	60-70	1	1 (Dust & Mist)
Alloying Elements				
Zinc (Zn)	7440-66-6	30-40	N.E.	5 (As Fume)
Tin (Sn)	7440-31-5	<1	2	2
Free Cutting Leaded				
Lead (Pb)	7439-92-1	<4	.05	.15 (Dust & Fume)

(1) % OF ALLOYING MATERIAL VARIES WITH GRADE OF MATERIAL (2) 1985 - 1986 ACGIH THRESHOLD LIMIT VALUE

II. PHYSICAL DATA

Material is (At Normal Conditions)	Appearance and Odor			
☐ Liquid ■ Solid ☐ Gas ☐ Other	GOLD/YELLOW COLORED, ODORLESS			
Acidity/Alkalinity pH = NA	Melting Point > 1600 F Boiling Point NA F	Specific Gravity (H_2O = 1) > 8 Solubility in water (% by weight) NA		Vapor Pressure (mm Hg at 20 C) NA

III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection NIOSH/MSHA APPROVED DUST & FUME RESPIRATOR SHOULD BE USED TO AVOID EXCESSIVE INHALATION OF PARTICULATES WHEN EXPOSURE EXCEEDS TLV'S	Hands, Arms and Body PROTECTIVE GLOVES ARE RECOMMENDED DURING HANDLING OF FINES EXPOSURE
Eyes and Face SAFETY GLASSES OR GOGGLES SHOULD BE UTILIZED AS REQUIRED BY EXPOSURE	Other Clothing and Equipment OTHER PROTECTIVE EQUIPMENT SHOULD BE UTILIZED AS REQUIRED BY THE WELDING STANDARD

IV. EMERGENCY MEDICAL PROCEDURES

IF EXPOSED TO EXCESSIVE LEVELS OF METAL FUMES, REMOVE TO FRESH AIR,

SEEK MEDICAL AID IMMEDIATELY

EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES.

V. HEALTH/SAFETY INFORMATION

STEEL PRODUCTS IN THE NATURAL STATE DO NOT PRESENT AN INHALATION, INGESTION OR CONTACT HAZARD. HOWEVER, OPERATIONS SUCH AS BURNING, WELDING, SAWING, BRAZING AND GRINDING MAY RELEASE FUMES AND/OR DUSTS WHICH MAY PRESENT HEALTH HAZARDS IF TLV'S ARE EXCEEDED

MAJOR EXPOSURE HAZARD
☒ INHALATION ☐ SKIN CONTACT ☐SKIN ABSORPTION ☐INGESTION

Short term exposure to fumes/dust may produce irritation of eyes and respiratory system. Inhalation of high concentrations of freshly formed oxide fumes of copper and lead may cause metal fume fever characterized by a metallic taste in the mouth and irritation of the throat and influenza-like symptoms.

Inhalation or ingestion of lead particles may result in lead-induced systemic toxicity. Symptoms of lead poisoning include abdominal cramps, anemia, muscle weakness and headache. Prolonged exposure can cause behavioral changes, kidney damage, CNS damage and reproductive effects.

SUSPECTED CANCER AGENT? NO THIS PRODUCTS INGREDIENTS ARE NOT FOUND IN THE LISTS BELOW
✓YES FEDERAL OSHA ✓NTP IARC

Fire and Explosion	Flash Point NA F	Auto Ignition Temperature NA F	Flammable Limits in Air Lower % Upper NA %	Extinguishing Media NA	
	Fire and Explosion Hazards DUST HAZARD EXISTS UNDER FAVORING CONDITIONS OF SMALL PRACTICE SIZE. DISPERSION IN AIR AND STRONG IGNITION SOURCE MAY RESULT IN AN EXPLOSION			Extinguishing Media not to be used NA	
Reactivity	Stability ■Stable ☐Unstable	Incompatibility (Materials to Avoid) MERCURY, AMMONIA, ACETYLENE, ACIDS			
	Conditions to Avoid EXPOSURE DURING STORAGE TO STRONG ACIDS, BASES OR OXIDIZING AGENTS				
	Hazardous Decomposition Products TOXIC GASES, AEROSOLS & VAPORS MAY BE RELEASED IN A FIRE INVOLVING COPPER ALLOYS IF FUMES OF OTHER COMPOUNDS OR CONTACTING MATERIALS ARE INVOLVED				

VI. ENVIRONMENTAL

Spill or Leak Procedures
NA

Waste Disposal Method
ACCORDING TO LOCAL, STATE AND FEDERAL REGULATIONS

VII. ADDITIONAL INFORMATION

VENTILATION: LOCAL EXHAUST VENTILATION SHOULD BE UTILIZED WHEN WELDING, BURNING, SAWING, BRAZING, GRINDING OR MACHINING WHEN EXPOSURE EXCEEDS TLV'S

IN WELDING, PRECAUTIONS SHOULD BE TAKEN FOR AIRBORNE CONTAMINATES WHICH MAY ORIGINATE FROM COMPONENTS OF WELDING ROD

ARC OR SPARK GENERATED WHEN WELDING OR BURNING COULD BE A SOURCE OF IGNITION FOR COMBUSTABLE AND FLAMMABLE MATERIALS